

1. A purified polypeptide comprising an amino acid sequence that is at least 80% identical to the amino acid sequence of SEQ ID NO: 7.
2. The purified polypeptide of claim 1, wherein the amino acid sequence is at least 90% identical to the amino acid sequence of SEQ ID NO: 7.
- 5       3. The purified polypeptide of claim 2, wherein the amino acid sequence is at least 95% identical to the amino acid sequence of SEQ ID NO: 7.
4. A purified polypeptide comprising the amino acid sequence of SEQ ID NO: 7.
5. A purified polypeptide comprising an amino acid sequence that is at least 80% identical to the amino acid sequence of SEQ ID NO: 8.
- 10     6. The purified polypeptide of claim 5, wherein the amino acid sequence is at least 90% identical to the amino acid sequence of SEQ ID NO: 8.
7. The purified polypeptide of claim 6, wherein the amino acid sequence is at least 95% identical to the amino acid sequence of SEQ ID NO: 8.
8. A purified polypeptide comprising the amino acid sequence of SEQ ID NO: 8.
- 15     9. A purified polypeptide comprising an amino acid sequence that is at least 80% identical to the amino acid sequence of SEQ ID NO: 9.
10. The purified polypeptide of claim 9, wherein the amino acid sequence is at least 90% identical to the amino acid sequence of SEQ ID NO: 9.
11. The purified polypeptide of claim 10, wherein the amino acid sequence is at least 95% identical to the amino acid sequence of SEQ ID NO: 9.

12. A purified polypeptide comprising the amino acid sequence of SEQ ID NO: 9.
13. A purified polypeptide comprising an amino acid sequence that is at least 80% identical to the amino acid sequence of SEQ ID NO: 10.
14. The purified polypeptide of claim 13, wherein the amino acid sequence is at least 5 90% identical to the amino acid sequence of SEQ ID NO: 10.
15. The purified polypeptide of claim 14, wherein the amino acid sequence is at least 95% identical to the amino acid sequence of SEQ ID NO: 10.
16. A purified polypeptide comprising the amino acid sequence of SEQ ID NO: 10.
17. A purified polypeptide comprising an amino acid sequence that is at least 80% 10 identical to the amino acid sequence of SEQ ID NO: 11.
18. The purified polypeptide of claim 17, wherein the amino acid sequence is at least 90% identical to the amino acid sequence of SEQ ID NO: 11.
19. The purified polypeptide of claim 18, wherein the amino acid sequence is at least 95% identical to the amino acid sequence of SEQ ID NO: 11.
- 15 20. A purified polypeptide comprising the amino acid sequence of SEQ ID NO: 11.
21. A purified polypeptide comprising an amino acid sequence that is at least 80% identical to the amino acid sequence of SEQ ID NO: 12.
22. The purified polypeptide of claim 21, wherein the amino acid sequence is at least 90% identical to the amino acid sequence of SEQ ID NO: 12.
- 20 23. The purified polypeptide of claim 22, wherein the amino acid sequence is at least 95% identical to the amino acid sequence of SEQ ID NO: 12.

24. A purified polypeptide comprising the amino acid sequence of SEQ ID NO: 12.
25. An isolated nucleic acid encoding the polypeptide of claim 3 or 4.
26. An isolated nucleic acid encoding the polypeptide of claim 7 or 8.
27. An isolated nucleic acid encoding the polypeptide of claim 11 or 12.
- 5 28. An isolated nucleic acid encoding the polypeptide of claim 15 or 16.
29. An isolated nucleic acid encoding the polypeptide of claim 19 or 20.
30. An isolated nucleic acid encoding the polypeptide of claim 23 or 24.
31. An isolated nucleic acid molecule comprising the nucleotide sequence of SEQ ID NO: 13.
- 10 32. An isolated nucleic acid molecule comprising the nucleotide sequence of SEQ ID NO: 14.
33. An isolated nucleic acid molecule comprising the nucleotide sequence of SEQ ID NO: 15.
- 15 34. An isolated nucleic acid molecule comprising the nucleotide sequence of SEQ ID NO: 16.
35. An isolated nucleic acid molecule comprising the nucleotide sequence of SEQ ID NO: 17.
36. An isolated nucleic acid molecule comprising the nucleotide sequence of SEQ ID NO: 18.

37. The isolated nucleic acid of claim 25, further comprising an operably linked heterologous promoter.

38. The isolated nucleic acid of claim 26, further comprising an operably linked heterologous promoter.

5       39. The isolated nucleic acid of claim 27, further comprising an operably linked heterologous promoter.

40. The isolated nucleic acid of claim 28, further comprising an operably linked heterologous promoter.

10      41. The isolated nucleic acid of claim 29, further comprising an operably linked heterologous promoter.

42. The isolated nucleic acid of claim 30, further comprising an operably linked heterologous promoter.

43. A method comprising:

- 15      (a) providing a polypeptide comprising the amino acid sequence of SEQ ID NO:7;  
          (b) contacting a test compound to the polypeptide; and  
          (c) measuring the binding of the test compound to the polypeptide.

44. A method comprising:

- 20      (a) providing a polypeptide comprising the amino acid sequence of SEQ ID NO:8;  
          (b) contacting a test compound to the polypeptide; and  
          (c) measuring the binding of the test compound to the polypeptide.

45. A method comprising:

(a) providing a polypeptide comprising the amino acid sequence of SEQ ID

NO:9;

(b) contacting a test compound to the polypeptide; and

5 (c) measuring the binding of the test compound to the polypeptide.

46. A method comprising:

(a) providing a polypeptide comprising the amino acid sequence of SEQ ID

NO:10;

(b) contacting a test compound to the polypeptide; and

10 (c) measuring the binding of the test compound to the polypeptide.

47. A method comprising:

(a) providing a polypeptide comprising the amino acid sequence of SEQ ID

NO:11;

(b) contacting a test compound to the polypeptide; and

15 (c) measuring the binding of the test compound to the polypeptide.

48. A method comprising:

(a) providing a polypeptide comprising the amino acid sequence of SEQ ID

NO:12;

(b) contacting a test compound to the polypeptide; and

20 (c) measuring the binding of the test compound to the polypeptide.

49. The method of claim 43, further comprising measuring PEAMT1-like activity of the polypeptide.

50. The method of claim 44, further comprising measuring PEAMT1-like activity of the polypeptide.

51. The method of claim 45, further comprising measuring PEAMT1-like activity of the polypeptide.
52. The method of claim 46, further comprising measuring PEAMT1-like activity of the polypeptide.
- 5 53. The method of claim 47, further comprising measuring PEAMT2-like activity of the polypeptide.
54. The method of claim 48, further comprising measuring PEAMT2-like activity of the polypeptide.
55. The method of claim 43, further comprising:
  - 10 (a) providing a second polypeptide, wherein the polypeptide comprises the amino acid sequence of a plant PEAMT-like polypeptide;
  - (b) contacting the test compound to the second polypeptide; and
  - (c) measuring the binding of the test compound to the second polypeptide.
56. The method of claim 44, further comprising:
  - 15 (a) providing a second polypeptide, wherein the second PEAMT-like polypeptide is a plant PEAMT-like polypeptide;
  - (b) contacting the test compound to the second polypeptide;
  - and
  - (c) measuring the binding of the test compound to the second polypeptide.
- 20 57. The method of claim 45, further comprising:
  - (a) providing a second polypeptide, wherein the polypeptide comprises the amino acid sequence of a plant PEAMT-like polypeptide;
  - (b) contacting the test compound to the second polypeptide; and
  - (c) measuring the binding of the test compound to the second polypeptide.

58. The method of claim 46, further comprising:

- (a) providing a second polypeptide, wherein the second PEAMT-like polypeptide is a plant PEAMT-like polypeptide;
- 5 (b) contacting the test compound to the second polypeptide;
- and
- (c) measuring the binding of the test compound to the second polypeptide.

59. The method of claim 47, further comprising:

- (a) providing a second polypeptide, wherein the polypeptide comprises the amino acid sequence of a plant PEAMT-like polypeptide;
- 10 (b) contacting the test compound to the second polypeptide; and
- (c) measuring the binding of the test compound to the second polypeptide.

60. The method of claim 48, further comprising:

- (a) providing a second polypeptide, wherein the second PEAMT-like polypeptide is a plant PEAMT-like polypeptide;
- 15 (b) contacting the test compound to the second polypeptide;
- and
- (c) measuring the binding of the test compound to the second polypeptide.

61. A method comprising:

- (a) providing a polypeptide comprising the amino acid sequence of SEQ ID NO:7;
- 20 (b) contacting a test compound to the polypeptide; and
- (c) measuring an PEAMT1-like activity of the polypeptide, wherein a change in PEAMT-like activity relative to the PEAMT1-like activity of the polypeptide in the absence of the test compound is an indication that the test compound alters the activity of the polypeptide.

62. A method comprising:

- (a) providing a polypeptide comprising the amino acid sequence of SEQ ID NO:8;
- 5 (b) contacting a test compound to the polypeptide; and
- (c) measuring an PEAMT1-like activity of the polypeptide, wherein a change in PEAMT-like activity relative to the PEAMT1-like activity of the polypeptide in the absence of the test compound is an indication that the test compound alters the activity of the polypeptide.

63. A method comprising:

- 10 (a) providing a polypeptide comprising the amino acid sequence of SEQ ID NO:9;
- (b) contacting a test compound to the polypeptide; and
- (c) measuring an PEAMT1-like activity of the polypeptide, wherein a change in PEAMT-like activity relative to the PEAMT1-like activity of the polypeptide in the absence 15 of the test compound is an indication that the test compound alters the activity of the polypeptide.

64. A method comprising:

- (a) providing a polypeptide comprising the amino acid sequence of SEQ ID NO:10;
- 20 (b) contacting a test compound to the polypeptide; and
- (c) measuring an PEAMT1-like activity of the polypeptide, wherein a change in PEAMT-like activity relative to the PEAMT1-like activity of the polypeptide in the absence of the test compound is an indication that the test compound alters the activity of the polypeptide.

65. A method comprising:

(a) providing a polypeptide comprising the amino acid sequence of SEQ ID

NO:11;

(b) contacting a test compound to the polypeptide; and

5 (c) measuring an PEAMT2-like activity of the polypeptide, wherein a change in PEAMT-like activity relative to the PEAMT2-like activity of the polypeptide in the absence of the test compound is an indication that the test compound alters the activity of the polypeptide.

66. A method comprising:

10 (a) providing a polypeptide comprising the amino acid sequence of SEQ ID

NO:12;

(b) contacting a test compound to the polypeptide; and

15 (c) measuring an PEAMT2-like activity of the polypeptide, wherein a change in PEAMT-like activity relative to the PEAMT2-like activity of the polypeptide in the absence of the test compound is an indication that the test compound alters the activity of the polypeptide.

67. The method of claim 61, further comprising the steps of:

(a) providing a second polypeptide, wherein the second polypeptide comprises the amino acid sequence of a plant PEAMT-like polypeptide;

20 (b) contacting the test compound to the second polypeptide; and

(c) measuring an PEAMT-like activity of the second polypeptide.

68. The method of claim 62, further comprising:

(a) providing a second polypeptide, wherein the second PEAMT-like polypeptide is plant PEAMT-like polypeptide;

25 (b) contacting the test compound to the second polypeptide; and

(c) measuring an PEAMT-like activity of the second polypeptide.

69. The method of claim 63, further comprising the steps of:
  - (a) providing a second polypeptide, wherein the second polypeptide comprises the amino acid sequence of a plant PEAMT-like polypeptide;
  - (b) contacting the test compound to the second polypeptide; and
  - 5 (c) measuring an PEAMT-like activity of the second polypeptide.
70. The method of claim 64, further comprising:
  - (a) providing a second polypeptide, wherein the second PEAMT-like polypeptide is plant PEAMT-like polypeptide;
  - (b) contacting the test compound to the second polypeptide; and
  - 10 (c) measuring an PEAMT-like activity of the second polypeptide.
71. The method of claim 65, further comprising the steps of:
  - (a) providing a second polypeptide, wherein the second polypeptide comprises the amino acid sequence of a plant PEAMT-like polypeptide;
  - (b) contacting the test compound to the second polypeptide; and
  - 15 (c) measuring an PEAMT-like activity of the second polypeptide.
72. The method of claim 66, further comprising:
  - (a) providing a second polypeptide, wherein the second PEAMT-like polypeptide is plant PEAMT-like polypeptide;
  - (b) contacting the test compound to the second polypeptide; and
  - 20 (c) measuring an PEAMT-like activity of the second polypeptide.
73. An antibody that binds specifically to a polypeptide consisting of SEQ ID NO: 7.
74. An antibody that binds specifically to a polypeptide consisting of SEQ ID NO: 8.
75. An antibody that binds specifically to a polypeptide consisting of SEQ ID NO: 9.
76. An antibody that binds specifically to a polypeptide consisting of SEQ ID NO: 10.

77. An antibody that binds specifically to a polypeptide consisting of SEQ ID NO: 11.
78. An antibody that binds specifically to a polypeptide consisting of SEQ ID NO: 12.
79. An isolated nucleic acid molecule that hybridizes under high stringency conditions a nucleic acid molecule consisting of SEQ ID NO: 1.  
5        80. An isolated nucleic acid molecule that hybridizes under high stringency conditions to a nucleic molecule consisting of SEQ ID NO: 2.
81. An isolated nucleic acid molecule that hybridizes under high stringency conditions a nucleic acid molecule consisting of SEQ ID NO: 3.  
10      82. An isolated nucleic acid molecule that hybridizes under high stringency conditions to a nucleic molecule consisting of SEQ ID NO: 4.
83. An isolated nucleic acid molecule that hybridizes under high stringency conditions a nucleic acid molecule consisting of SEQ ID NO: 5.
84. An isolated nucleic acid molecule that hybridizes under high stringency conditions to a nucleic molecule consisting of SEQ ID NO: 6.